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The Laser Inertial Fusion Energy (LIFE) concept is being designed to operate as either a pure fusion or hybrid fusion-fission system. A key component of a LIFE engine is the fusion chamber subsystem. The present work details the chamber design for the pure fusion option.

The fusion chamber consists of the first wall and blanket. This integrated system must absorb the fusion energy, produce fusion fuel to replace that burned in previous targets, and enable both target and laser beam transport to the ignition point. The chamber system also must mitigate target emissions, including ions, x-rays and neutrons and reset itself to enable operation at 10-15 Hz. Finally, the chamber must offer a high level of availability, which implies both a reasonable lifetime and the ability to rapidly replace damaged components. An integrated LIFE design that meets all of these requirements is described herein.

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